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Fay Sharpe Fagan
Minnich & McKee
7th Floor
1100 Superior Avenue
Cleveland, OH 44114-2518

EXAMINER	
LEUNG, JENNIFER A	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/069,261	DURST ET AL.	
	Examiner	**Art Unit**	
	JENNIFER A. LEUNG	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 June 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3-15 and 21-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3-15 and 21-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 13, 2008 has been entered.

Status of the Claims

2. Claims 1, 2 and 16-20 are cancelled. Claims 28-38 are newly added. Claims 3-15 and 21-38 are under consideration.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 3, 5, 7-9, 21 and 24-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Parker et al. (US 1,846,978).

Regarding claim 3, Parker et al. discloses an apparatus comprising: a combustion chamber (i.e., defined in part by the inner portion **35**^{x}) and a burner that provides for combustion of a fuel/oxidant mixture within said combustion chamber (see FIG. 8; page 4, line 78 to page 5, line 43; also, FIGs. 9 and 14); a material which is capable of enduring a maximum temperature that is less than a combustion temperature of said fuel and said oxidant (i.e., a refractory material

that appears to be labeled as **7**^{X1} in FIG. 8; same as the refractory material **8** shown in FIG. 1 and described at page 2, lines 76-85), provided in said combustion chamber; one or several supply lines (e.g., a fuel supply line **15**^{x}, water supply line **44x**) and an additional supply line (i.e., pipe **40**^{x}) connected to a low combustion value gas supply (i.e., a superheated steam source, generated from the water supplied by pipe **44**^{x} and contained in tank **41**^{x}) in order to conduct the low combustion value gas into the combustion chamber. The recitations with respect to "a maximum temperature" or a "temperature during combustion" have been considered as functional language that adds no further patentable weight to the claim. The manner of operating a device does not differentiate apparatus claims from the prior art, and the recitation of a material or article worked upon does not further limit apparatus claims. See MPEP 2114, 2115.

Regarding claim 5, Parker et al. discloses a pre-mix chamber (i.e., defined by tube **6**^{x}; FIG. 8) in which fuel and oxidant can be mixed before combustion.

Regarding claim 7, Parker et al. discloses that the pre-mix chamber **6**^{x} is supplied with the additional gas (i.e., the superheated steam, via pipe **40**^{x} and nozzle **9**^{x}), where the additional gas is mixed with the fuel before the pre-mix chamber (i.e., the super heated steam is first mixed with the fuel at injector **51**^{x}).

Regarding claim 8, the size of a lateral surface of a sidewall of the premix chamber in proportion to the volume of the pre-mix chamber is sufficient to accommodate any free energy from the detonation of gases in the pre-mix chamber (i.e., the lateral surface of the sidewall **6x** is sufficiently large relative to the volume of the pre-mix chamber; see FIG. 8).

Regarding claim 9, Parker et al. discloses that the pre-mix chamber defined by the tube **6**^{x} is structurally capable of being cooled, i.e., by means of the water jacket located adjacent to the

chamber (i.e., defined by the inner and outer portions **35**^{x}, **36**^{x}), and by means of the vaporizing coil **11**^{x} located adjacent to the chamber.

Regarding claims 21 and 24, Parker et al. (FIG. 8; page 4, line 78 to page 5, line 43) discloses an apparatus comprising: a combustion chamber comprising a material which is capable of enduring a maximum temperature that is lower than a combustion temperature (i.e., a combustion chamber defined in part by inner portion **35**^{x}, containing a refractory material that appears to be labeled as **7**^{X1} in FIG. 8; same as the refractory material **8** shown in FIG. 1 and described at page 2, lines 76-85); at least one supply line (e.g., fuel supply pipe **15**^{x}) in communication with the combustion chamber for supplying at least one of fuel and an oxidation agent to the combustion chamber; a low combustion value gas supply (i.e., a superheated steam source, generated from the water supplied by pipe **44**^{x} and contained in tank **41**^{x}); and an additional supply line (i.e., pipe **40**^{x}) in communication with the low combustion value gas supply and the combustion chamber, for introducing a low combustion value gas (i.e., the superheated steam) into the combustion chamber.

Regarding claim 25, Parker et al. (FIG. 8; page 4, line 78 to page 5, line 43) discloses an apparatus comprising: a combustion chamber comprising a material which is capable of enduring a maximum temperature that is lower than a combustion temperature (i.e., a combustion chamber defined by inner portion **35**^{x}, containing a refractory material that appears to be labeled as **7**^{X1} in FIG. 8; same as the refractory material **8** shown in FIG. 1 and described at page 2, lines 76-85), the combustion chamber having an inlet and an outlet (see figure); a pre-mix chamber (i.e., defined by tube **6**^{x}) disposed upstream from an in communication with the inlet of the combustion chamber; at least one supply line (e.g., fuel supply pipe **15**^{x}) in communication with

the pre-mix chamber for supplying at least one of fuel and an oxidation agent to the combustion chamber; a low combustion value gas supply (i.e., a superheated steam source, generated from the water supplied by pipe **44**^{x} and contained in tank **41**^{x}); and an additional supply line (i.e., pipe **40**^{x}) in communication with the low combustion value gas supply and the pre-mix chamber for introducing the low combustion value gas into the combustion chamber.

Regarding claim 26, at least one additional supply line **40**^{x} (FIG. 8) is in communication with the combustion chamber to deliver the low combustion value gas (i.e., superheated steam) into the combustion chamber to mix with the fuel and the oxidation agent.

Regarding claim 27, Parker et al. discloses a pre-mix chamber (i.e., defined by tube **6**^{x}; FIG. 8) connected with the at least one supply line that allows mixing of the low combustion value gas with the fuel/oxidant mixture.

Regarding claims 28-30, the apparatus of Parker et al. structurally meets the claims, since a recitation of the intended use of the claimed invention (e.g., for synthesis of hydrochloric acid) must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. Furthermore, the recitations of the fuel including a "chlorine-containing compound" and the oxidant/oxidation agent including "hydrogen" do not impart further patentable weight to the claims, since the fuel and oxidant/ oxidation agent are not considered elements of the apparatus. See MPEP 2115.

Instant claims 3, 5, 7-9, 21 and 24-30 structurally read on the apparatus of Parker et al.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 3-9, 21, 22 and 24-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hays (US 2,087,031) in view of Onimaru et al. (US 5,616,021).

Regarding claims 3-5, 26 and 27, Hays (see figure and page 2, lines 17-74) discloses an apparatus comprising: a combustion chamber **CT** and a burner for combusting a fuel/oxidant mixture within the combustion chamber; a material (i.e., a mass of refractory material **Re**) provided in said combustion chamber, said material being capable of enduring a maximum temperature that is less than a combustion temperature; and one or several supply lines for conducting fuel (i.e., via inlet pipe **P**) and an oxidant (i.e., via inlet conduit **A**) into the chamber. The apparatus also comprises a pre-mix chamber (i.e., comprising chamber **M**), in which the fuel and oxidant are mixed before combustion, and a low combustion value gas supply (i.e., the combustion products **HG** generated in the combustion chamber **CT**). Hays, however, is silent as to the apparatus comprising at least one additional supply line connected to the low combustion value gas supply, for conducting the low combustion value gas (i.e., the combustion products **HG**) to the pre-mix chamber **M** and into the combustion chamber **CT**.

Onimaru et al. teaches an apparatus comprising a burner (FIG. 1; column 4, line 43 to column 6, line 36) for combusting a fuel/oxidant mixture within a combustion chamber (i.e., defined by burning cylinder **22**), with one or several supply lines for conducting fuel (i.e., via supply pipe **33**) and an oxidant (i.e., via supply pipe **41**) into the chamber. Specifically, the apparatus comprises at least one additional supply line (i.e., an exhaust gas circulating pipe **51**) connected to a low combustion value gas supply (i.e., comprising the combustion products from the combustion chamber **22**), thereby conducting the low combustion value gas back into the combustion chamber **22** via the pre-mix chamber (i.e., defined by mixing cylinder **21**).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide at least one additional supply line, connected to the low combustion value gas supply, in order to conduct the low combustion value gas (i.e., the combustion products) to the pre-mix chamber **M** and into the combustion chamber **CT** in the apparatus of Hays, because the additional supply line would allow for the combustion products to be recycled to the combustion chamber, thereby making it possible to properly maintain the fuel burning condition at a desirable and stable condition so as not to induce an excessive air supplying condition with respect to the supplied fuel in the event that the fuel supply amount is reduced, as taught by Onimaru et al. (see column 6, lines 26-36).

The recitations with respect to “a maximum temperature” or a “temperature during combustion” have been considered as functional language that adds no further patentable weight to the claim. The manner of operating a device does not differentiate apparatus claims from the prior art, and the recitation of a material or article worked upon does not further limit apparatus claims. See MPEP 2114, 2115.

Regarding claim 6, Hays further discloses that the pre-mix chamber **M** includes static mixing elements (i.e., a flow straightening plate **St**, a venturi plate **V**). The flow velocity component of the mixture in the pre-mix chamber **M** is inherently greater than the flame velocity in the combustion chamber **CT**, as evidenced by the impingement and mushrooming of the mixture over the surface of the refractory **Re** subsequent to its injection through the orifices **O** of the venturi plate **V** (see page 2, lines 45-55).

Regarding claim 7, the modified apparatus of Hays is structurally capable of providing the intended operation, since the pre-mix chamber **M**, as modified by the teachings of Onimaru et al., would be supplied with the additional gas (i.e., the recycled combustion products). In addition, Onimaru et al. (FIG. 1) teaches that the additional supply line **51** is configured such that the additional gas (i.e., the exhaust gas) is mixed with the oxidant (i.e., at the intersection with conduit **41**) before entering a pre-mix chamber (i.e., defined by mixing cylinder **21**).

Regarding claim 8, in the apparatus of Hays, the size of the lateral surface of a sidewall **H** of the premix chamber **M** in proportion to the volume of the pre-mix chamber **M** is structurally capable of accommodating free energy from detonation of gases in the pre-mix chamber, since the size of the lateral surface of the sidewall **H** is sufficiently large, and the proportioning of the lateral surface and volume of the pre-mix chamber **M** in Hays appears similar to that of Applicant's apparatus, as shown in the figures.

Regarding claim 9, the pre-mix chamber **M** in the modified apparatus of Hays is structurally capable of being cooled (i.e., by a heat transfer medium flowing in the cooling jacket **J**, located adjacent to the premix chamber; see FIG. 1). Also, the pre-mix chamber **M** is structurally capable of being cooled by the atmospheric air present on the exterior side of wall **H**,

adjacent to the pre-mix chamber **M**.

Regarding claims 21 and 22, Hays (see figure; page 2, lines 17-74) discloses an apparatus comprising: a combustion chamber **CT** in which a material (i.e., refractory material **Re**) is provided, the material being capable of enduring a maximum temperature that is less than the combustion temperature; at least one supply line in communication with the combustion chamber **CT** for supplying at least one of fuel (i.e., via pipe **P**) and an oxidation agent (i.e., via pipe **A**), in order to conduct these into the combustion chamber; and a low combustion value gas supply (i.e., comprising the combustion products **HG** generated by the combustion chamber **CT**).

Hays, however, is silent as to the provision of an additional supply line in communication with the low combustion value gas supply and the combustion chamber (i.e., in the form of an outlet line in communication with an outlet of the combustion chamber), for introducing the low combustion value gas (i.e., the combustion products **HG**) into the combustion chamber **CT** to mix with the at least one of fuel and an oxidation agent.

Onimaru et al. (FIG. 1; column 4, line 43 to column 6, line 36) teaches an apparatus comprising a combustion chamber (i.e., defined by cylinder **22**), at least one supply line in communication with the combustion chamber for supplying at least one of fuel (i.e., via supply pipe **33**) and an oxidation agent (i.e., via supply pipe **41**), in order to conduct these into the combustion chamber; and a low combustion value gas supply (i.e., the combustion products produced by the combustion chamber **22**). Specifically, the apparatus comprises at least one additional supply line (i.e., an exhaust gas circulating pipe **51**) connected to the low combustion value gas supply at the outlet of the combustion chamber, for conducting the low combustion value gas (i.e., the combustion products) back into the combustion chamber **22**. It would have

been obvious for one of ordinary skill in the art at the time the invention was made to provide at least one additional supply line connected to the low combustion value gas supply, in order to conduct the low combustion value gas into the combustion chamber in the apparatus of Hays, because the additional supply line would allow for the combustion products to be recycled to the combustion chamber, thereby making it possible to properly maintain the fuel burning condition at a desirable and stable condition so as not to induce an excessive air supplying condition with respect to the supplied fuel when the fuel supply amount is reduced, as taught by Onimaru et al. (see column 6, lines 26-36).

Regarding claim 24, the low combustion value gas supply (i.e., the combustion products **HG**) comprises at least one of an inert gas source and a steam source, since the combustion reaction generates carbon dioxide and water vapor.

Regarding claim 25, Hays (see figure and page 2, lines 17-74) discloses an apparatus comprising: a combustion chamber **CT** in which a material (i.e., refractory material **Re**) is provided, said material being capable of enduring a maximum temperature that is less than the combustion temperature; the combustion chamber **CT** having an inlet and an outlet (i.e., see flow arrows in the figure); a pre-mix chamber (i.e., comprising chamber **M**) disposed upstream from and in communication with the inlet of the combustion chamber **CT**; at least one supply line in communication with the pre-mix chamber **M** for supplying at least one of fuel (i.e., via pipe **P**) and an oxidation agent (i.e., via pipe **A**) into the combustion chamber **CT**; and a low combustion value gas supply (i.e., the combustion products produced by the combustion chamber **CT**).

Hays, however, is silent as to the provision of an additional supply line in communication with the low combustion value gas supply and the pre-mix chamber **M**, for introducing the low

combustion value gas (i.e., the combustion products) into the combustion chamber **CT**.

Onimaru et al. (FIG. 1; column 4, line 43 to column 6, line 36) teaches an apparatus comprising a combustion chamber (i.e., defined by cylinder **22**), at least one supply line in communication with the combustion chamber for supplying at least one of fuel (i.e., via supply pipe **33**) and an oxidation agent (i.e., via supply pipe **41**), in order to conduct these into the combustion chamber; and a low combustion value gas supply (i.e., the combustion products from the combustion chamber **22**). Specifically, the apparatus comprises at least one additional supply line (i.e., an exhaust gas circulating pipe **51**) connected to the low combustion value gas supply at the outlet of the combustion chamber, for conducting the low combustion value gas (i.e., the combustion products) back into the combustion chamber, via a pre-mix chamber (i.e., defined by mixing tube **21**). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide at least one additional supply line connected to the low combustion value gas supply, in order to conduct the low combustion value gas to the pre-mix chamber **M** and into the combustion chamber **CT** in the apparatus of Hays, because the additional supply line would allow for the combustion products to be recycled to the combustion chamber, thereby making it possible to properly maintain the fuel burning condition at a desirable and stable condition so as not to induce an excessive air supplying condition with respect to the supplied fuel in the event that the fuel supply amount is reduced, as taught by Onimaru et al. (see column 6, lines 26-36).

Regarding claims 28-30, the modified apparatus of Hays structurally meets the claims, since a recitation of the intended use of the claimed invention (e.g., for synthesis of hydrochloric acid) must result in a structural difference between the claimed invention and the prior art in

order to patentably distinguish the claimed invention from the prior art. Furthermore, the recitations of the fuel including a “chlorine-containing compound” and the oxidant/oxidation agent including “hydrogen” do not impart further patentable weight to the claims, since the fuel and oxidant/oxidation agent are not considered elements of the apparatus. See MPEP 2115.

5. Claims 10-13 and 31-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hays (US 2,087,031) in view of Onimaru et al. (US 5,616,021), as applied to claim 3 above, and further in view of Durst et al. (US 5,522,723).

Regarding claims 10 and 13, Hays discloses that combustion chamber **CT** contains a refractory material **Re**. Hays, however, does not specifically indicate that the material **Re** comprises a porous material with inter-connected hollow spaces, suitable in size for flame development. Durst et al. (FIG. 1) teaches a combustion chamber (i.e., defined by housing **1**) in which a porous material **5** (see column 4, lines 23-30; column 2, lines 21-40) is provided, the porous material having inter-connected hollow spaces suitable in size for flame development, and the porous material **5** comprising a packing material, such as spheres (see column 4, lines 45-67). It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute the porous material of Durst et al. for the refractory material **Re** in the modified apparatus of Hays, because the porous material produces a high turbulence so that higher combustion rates can be achieved, as taught by Durst et al. (see column 2, line 65 to column 3, line 5).

Regarding claims 11 and 12, Hays is silent as to the combustion chamber containing a porous material whose porosity changes over to larger pores in the direction toward the development of flame, wherein the combustion chamber has at least two zones with material of

differing pore size, between which, the material has a pore size that provides the critical Peclet number. Durst et al. (FIG. 1; column 8, lines 48-60) teaches a combustion chamber (i.e., defined by housing **1**) containing a porous material **5** whose porosity changes over to larger pores in the direction toward the development of flame, wherein the combustion chamber has at least two zones **A** and **C** with a material of differing pore size, between which, the material has a pore size (in zone **B**) that provides the critical Peclet number. It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a porous material having the claimed porosity configuration in the combustion chamber of the modified apparatus of Hays, because the porosity configuration would provide a defined position for the flame development, thereby increasing burner stability, as taught by Durst (see column 3, lines 33-51).

Regarding claims 31-33, Hays (see figure; page 2, lines 17-74) discloses an apparatus comprising: a combustion chamber **CT** having an inlet (i.e., orifice **O**) and an outlet (i.e., at grid **Gr**); the combustion chamber containing a material **Re** that is capable of withstanding a maximum temperature that is lower than a combustion temperature; a mixing chamber **M** disposed upstream from an in communication with said inlet **O**; a first supply line **P** that feeds a first gas stream (i.e., fuel) into the mixing chamber at a first location; and a second supply line **A** that feeds a second gas stream (i.e., an oxidant) into the mixing chamber at a second location spaced from the first location. The apparatus further produces a supply of low combustion value gas (i.e., the combustion products **HG** generated in the combustion chamber **CT**).

Hays, however, is silent as to the apparatus comprising a low combustion value gas supply line that supplies the low combustion value gas **HG** to said mixing chamber **M** via said first supply line **P** and/or said second supply line **A**.

Onimaru et al. teaches an apparatus comprising a burner (FIG. 1; column 4, line 43 to column 6, line 36) for combusting a fuel/oxidant mixture within a combustion chamber (i.e., defined by burning cylinder **22**), with one or several supply lines for conducting fuel (i.e., via supply pipe **33**) and an oxidant (i.e., via supply pipe **41**) into the chamber. Specifically, the apparatus comprises a low combustion value gas supply line (i.e., an exhaust gas circulating pipe **51**) that supplies a low combustion value gas supply (i.e., comprising the combustion products from the combustion chamber **22**) to a mixing chamber (i.e., defined by mixing cylinder **21**) via the supply line **41**. It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a low combustion value gas supply line for supplying the low combustion value gas supply **HG** to the mixing chamber **M** via said first supply line **P** and/or said second supply line **A** in the apparatus of Hays, because the low combustion value gas supply line would allow for the combustion products to be recycled to the combustion chamber, thereby making it possible to properly maintain the fuel burning condition at a desirable and stable condition so as not to induce an excessive air supplying condition with respect to the supplied fuel in the event that the fuel supply amount is reduced, as taught by Onimaru et al. (see column 6, lines 26-36).

Hays is further silent as to the material **Re** comprising a first porous material and a second porous material, wherein the pore size of the first porous material permits flame formation and the pore size of the second porous material retards flame formation, the first porous material being disposed in a first chamber region and the second porous material being disposed in a second chamber region that is intermediate said first chamber region and the inlet to the combustion chamber.

Durst et al., however, teaches a combustion chamber (i.e., defined by housing **1**; see FIGs. 1 and 2) having an inlet **2**, an outlet **3**, a first chamber region (i.e., Zone **C**) and a second chamber region (i.e., Zone **A**) intermediate said first chamber region **C** and said inlet **2**; wherein a first porous material is disposed in the first chamber region **C** and a second porous material is disposed in the second chamber region **A**, and wherein the first porous material has a pore size which permits flame formation (i.e., the pore size of the material in Zone **C** is sized for a Peclet number larger the critical Peclet number) and the second porous material has a pore size which retards flame formation (i.e., the pore size of the material in Zone A is sized for a Peclet number that is smaller than the critical Peclet number). (see column 3, lines 33-59; column 8, line 40 to column 9, line 36). It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute the configuration of first and second porous materials as taught by Durst et al. for the refractory material **Re** in the modified apparatus of Hays, because the configuration of first and second porous materials would provide a defined position for the flame development, thereby increasing burner stability, as taught by Durst (see column 3, lines 33-59).

Regarding claim 34, the modified apparatus of Hays structurally meets the claims, since a recitation of the intended use of the claimed invention (e.g., for synthesis of hydrochloric acid) must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. Furthermore, the recitations of the fuel including a "chlorine-containing compound" and the oxidant/oxidation agent including "hydrogen" do not impart further patentable weight to the claims, since the fuel and oxidant/ oxidation agent are not considered elements of the apparatus. See MPEP 2115.

Regarding claims 35-37, Hays (see figure; page 2, lines 17-74) discloses an apparatus

comprising: a combustion chamber **CT** having an inlet (i.e., orifice **O**) and an outlet (i.e., at grid **Gr**); the combustion chamber containing a material **Re** that is capable of withstanding a maximum temperature that is lower than a combustion temperature; a mixing chamber **M** disposed upstream from an in communication with said inlet **O**; a first supply line (i.e., a first nozzle **N** of the plurality of nozzles) that feeds a first gas stream (i.e., of fuel) into the mixing chamber at a first location; a second supply line **A** that feeds a second gas stream (i.e., of oxidant) into the mixing chamber at a second location spaced from the first location, and a third supply line (i.e., a second nozzle **N** of the plurality of nozzles) that feeds a third gas stream (i.e., of fuel) into the mixing chamber at a third location that is spaced from both the first and second locations. The apparatus further produces a supply of low combustion value gas (i.e., the combustion products **HG** generated in the combustion chamber **CT**).

Hays, however, is silent as to the apparatus comprising a low combustion value gas supply line that supplies the low combustion value gas **HG** to said mixing chamber **M** via one or more of said first supply line **N**, said second supply line **A**, and said third supply line **N**.

Onimaru et al. teaches an apparatus comprising a burner (FIG. 1; column 4, line 43 to column 6, line 36) for combusting a fuel/oxidant mixture within a combustion chamber (i.e., defined by burning cylinder **22**), with one or several supply lines for conducting fuel (i.e., via supply pipe **33**) and an oxidant (i.e., via supply pipe **41**) into the chamber. Specifically, the apparatus comprises a low combustion value gas supply line (i.e., an exhaust gas circulating pipe **51**) that supplies a low combustion value gas supply (i.e., comprising the combustion products from the combustion chamber **22**) to a mixing chamber (i.e., defined by mixing cylinder **21**) via the supply line **41**. It would have been obvious for one of ordinary skill in the art at the time the

invention was made to provide a low combustion value gas supply line for supplying the low combustion value gas supply **HG** to the mixing chamber **M** via one or more of said supply line**s** in the apparatus of Hays, because the low combustion value gas supply line would allow for the combustion products to be recycled to the combustion chamber, thereby making it possible to properly maintain the fuel burning condition at a desirable and stable condition so as not to induce an excessive air supplying condition with respect to the supplied fuel in the event that the fuel supply amount is reduced, as taught by Onimaru et al. (see column 6, lines 26-36).

Hays is further silent as to the material **Re** comprising a first porous material and a second porous material, wherein the pore size of the first porous material permits flame formation and the pore size of the second porous material retards flame formation, the first porous material being disposed in a first chamber region and the second porous material being disposed in a second chamber region that is intermediate said first chamber region and the inlet to the combustion chamber.

Durst et al., however, teaches a combustion chamber (i.e., defined by housing **1**; see FIGs. 1 and 2) having an inlet **2**, an outlet **3**, a first chamber region (i.e., Zone **C**) and a second chamber region (i.e., Zone **A**) intermediate said first chamber region **C** and said inlet **2**; wherein a first porous material is disposed in the first chamber region **C** and a second porous material is disposed in the second chamber region **A**, and wherein the first porous material has a pore size which permits flame formation (i.e., the pore size of the material in Zone **C** is sized for a Peclet number larger the critical Peclet number) and the second porous material has a pore size which retards flame formation (i.e., the pore size of the material in Zone A is sized for a Peclet number that is smaller than the critical Peclet number). (see column 3, lines 33-59; column 8, line 40 to

column 9, line 36). It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute the configuration of first and second porous materials as taught by Durst et al. for the refractory material **Re** in the modified apparatus of Hays, because the configuration of first and second porous materials would provide a defined position for the flame development, thereby increasing burner stability, as taught by Durst (see column 3, lines 33-59).

Regarding claim 38, the modified apparatus of Hays structurally meets the claims, since a recitation of the intended use of the claimed invention (e.g., for synthesis of hydrochloric acid) must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. Furthermore, the recitations of the fuel including a "chlorine-containing compound" and the oxidant/oxidation agent including "hydrogen" do not impart further patentable weight to the claims, since the fuel and oxidant/oxidation agent are not considered elements of the apparatus. See MPEP 2115.

6. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hays (US 2,087,031) in view of Onimaru et al. (US 5,616,021) and Durst et al. (US 5,522,723), as applied to claims 10 and 13 above, and further in view of Martin et al. (US 5,165,884).

Regarding claim 14, Hays further discloses the provision of a grid **Gr** for retaining the refractory material **Re** within the combustion chamber. The collective teaching of Hays, Onimaru et al. and Durst et al., however, is silent as to the provision of a grid at the border area, to prevent discharge of the bodies from one zone into the other. Martin et al. teaches a similar combustion device, wherein gas permeable barriers can be utilized to maintain the integrity of the matrix of porous bodies, so that adjacent layers of materials of differing sizes do not become mixed (see column 10, lines 26-34). It would have been obvious for one of ordinary skill in the

art at the time the invention was made to further provide a grid at the border area in the modified apparatus of Hays, on the basis of suitability for the intended use thereof, because the grid would help control the location of the various sized materials in the respective zones.

Regarding claim 15, in the modified apparatus of Hays, the grid would be structurally capable of being cooled, by means of the heat transfer medium flowing in the jacket **J** surrounding the combustion chamber **CT** (see figure).

7. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hays (US 2,087,031) in view of Onimaru et al. (US 5,616,021), as applied to claims 21 and 22 above, and further in view of Yamane et al. (US 3,982,878).

The collective teaching of Hays and Onimaru et al. is silent as to the provision of a heat exchanger, such that the outlet line from the combustion chamber is in communication with an inlet of the heat exchanger, and the outlet of the heat exchanger is in communication with the additional supply line. Yamane et al. (see FIG. 3; column 3, lines 53-66) teaches an apparatus comprising a combustion chamber **10** with supply lines for fuel **12** and oxidant **14**, the apparatus further comprising a heat exchanger **50**, wherein the outlet line **48** from the combustion chamber **10** is in communication with the inlet of the heat exchanger **50**, and the outlet of the heat exchanger **50** is in communication with an additional supply line (not labeled, see figure), for feeding the combustion products back into the combustion chamber **10**. It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a heat exchanger to the modified apparatus of Hays, on the basis of suitability for the intended use thereof, because the heat exchanger would allow for water contained in the combustion products to be recovered, before feeding the combustion products in a dehydrated form, back into the

combustion chamber, as taught by Yamane et al.

Response to Arguments

8. Applicant's arguments filed June 13, 2008 have been fully considered but they are not persuasive. Applicant (see page 10, last paragraph, to page 11, third paragraph) argues,

> "Parker et al. (U.S. Patent No. 1,846,978) does not teach the provision of a material [in the combustion chamber] which endures a maximum temperature that is less than the combustion temperature of the fuel (oil, gas, powdered coal or fuel with "equal facility"- page 2, left-hand column, lines 30-33) and oxidant (air- page 2, left-hand column, line 1) [combusted in the combustion chamber]. On the contrary… Parker et al. make it clear that the material provided in the combustion chamber must be able to endure the combustion temperature of the fuel and oxidant taught therein.
>
> … As explicitly taught on page 6, left-hand column, lines 4-9, the device of Parker et al. can be used without the steam equated by the Examiner with the low combustion value gas of the present invention. This, too, demonstrates that the material provided in the combustion chamber of Parker et al. must be able to endure the combustion temperature of the fuel and oxidant taught therein...
>
> It is moreover apparent... that Hays likewise fails to teach the claimed provision of a material [in the combustion chamber] which endures a maximum temperature that is less than the combustion temperature of any fuel and oxidant for which the combustion chamber thereof was designed."

The Examiner respectfully disagrees.

Parker et al. discloses that the material **7^{x1}** (i.e., refractory material of substantially spherical form; see FIG. 8) is structurally capable of enduring the combustion temperature of the fuel and oxidant mixture. Similarly, Hays discloses that the material **Re** (i.e., a refractory packing material) is structurally capable of enduring the combustion temperature of the fuel and oxidant mixture.

Because the "maximum temperature" being recited by Applicant is lower than the combustion temperature, it then follows that the material **7^{x1}** in Parker et al. and the material **Re** in Hays are structurally capable of enduring the lower "maximum temperature."

As an analogy, if a baking pan is capable of enduring a 450 °F oven, clearly, the baking pan would also be capable of enduring a cooler 350 °F oven.

Furthermore, the material as disclosed by Parker et al. and Hays (as well as Durst et al.) appears to be the same as or substantially the same as the materials being disclosed by Applicant (see specification, at page 12, second paragraph).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JENNIFER A. LEUNG whose telephone number is (571)272-1449. The examiner can normally be reached on 9:30 am - 5:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Jennifer A. Leung/
Primary Examiner, Art Unit 1797